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Estimating Local Bed Shear Stress from Velocity Observations[Peter R. Wilcock](#)**First published:**November 1996 [Full publication history](#)**DOI:**10.1029/96WR02277 [View/save citation](#)**Cited by:**

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Replicate velocity observations using conventional equipment under typical field conditions are used to evaluate the precision of different methods for estimating local boundary shear stress from velocity measurements. The bed shear velocity u_* can be estimated within 3% using the depth-averaged velocity in the vertically averaged logarithmic velocity profile. To be accurate, this method is limited to relatively simple flow geometries which may be expected to have the appropriate velocity structure. Estimates of u_* made using a single near-bed velocity observation are less precise by a factor of 3 because of the larger uncertainty associated with a single observation. Accuracy of this method requires appropriate flow conditions only near the bed, so it may be applied in a wider range of flow conditions, including spatially variable flow. Estimates of u_* from the slope of the near-bed velocity profile are the least precise and require the most restrictive flow conditions for accuracy but offer the advantage that they may be made without independent knowledge of the bed roughness.

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